
Division 16

DIVISION 16 ELECTRICAL**16.100 GENERAL REQUIREMENTS****A. Scope of Work**

1. Provide (furnish and install) the following for a complete electrical system:
 - a. Lighting systems including fixtures, supports and controls
 - b. Electrical power systems including wiring for lights, heating, ventilation and air-conditioning (HVAC) and plumbing, elevators (if any), fire protection, kitchen, laundry, signal and communication, miscellaneous outlets for convenience and other electric utilization equipment
 - c. Telecommunications cabling systems
 - d. Fire alarm system
 - e. Public address system
 - f. Televisitation, telemedicine, and video-conferencing systems.
2. Electrical systems must be designed by an electrical engineer licensed in the State of Montana, and all electrical construction documents must bear the name and seal of the Engineer/ Engineering firm.

B. Requirements

1. The electrical system shall conform to local codes and ordinances including the following:
 - a. National Electrical Code (N.E.C.), 2005 Edition
 - b. International Building Code (IBC), 2003 Edition
 - c. Occupancy, Safety and Health Administration (OSHA) regulations
 - d. Americans for Disability Act Accessibility Guidelines (ADAAGS).
2. Other Rules, Regulations, Design Guides and Standards
 - a. Design, installation and materials, equipment, fixtures, and other electrical appurtenances shall comply with applicable rules and standards of Underwriters Laboratories, Inc.(UL), American National Standards Institute, Inc.(ANSI), National Electrical Manufacturers Association (NEMA), Illuminating Engineering Society (IES), National Fire Protection Agency (NFPA), Electronic Industries Association-Telecommunications Industries Association (EIA-TIA), American Correction Association (ACA) and all other applicable design guides and standards.
 - b. Comply with the rules and regulations of the local power, telephone and cable TV utility companies providing services to this facility.

C. Service and Distribution Equipment

1. The Design-Builder must provide adequate power to the facility. Provide underground utility power from the local utility company. The Design-Builder shall coordinate service requirements with the power company and pay for any improvements and utility charges required to deliver power to the site.
2. Provide complete electrical distribution system to serve the project. Feeders, distribution panel boards and switchboards, transformers and other electrical distribution equipment shall be sized for calculated demand loads per NEC and provided with spare capacity for maximum planned facility capacity plus 20% spare capacity for future growth/modifications.
3. Provide power factor correction capacitors and controls to automatically correct power factor to 99% without instantaneously overcorrecting beyond unity at distribution panels and large motors over 10 hp.
4. Panelboards and feeders shall be sized for demand loads per NEC with minimum 25% spare capacity for future growth. Panelboards shall be installed in secured areas and located throughout the facility so as to limit length of branch circuit runs to less than 300 feet.
5. All electrical service and distribution equipment shall be located in secured electrical rooms not accessible to inmates.

D. Emergency Power

1. Diesel generator system shall be provided to provide emergency power to the facility in the event of utility power failure. Emergency generator shall be located in separate room and secured from inmate access. A fuel storage tank and supply sufficient for three (3) days of continuous operation shall be furnished.
2. Diesel generator and distribution wiring system shall be sized to carry all required emergency loads with spare capacity for maximum planned facility capacity plus minimum 20% spare capacity for future growth/modifications. In general, emergency loads include interior emergency lights, all exterior lights, kitchen, medical facilities, ventilation fans, sump pumps, security electronics, CCTV system, fire protection and alarm systems, public address and intercoms, telephone and data systems, refrigeration and medical equipment, motorized doors and gates, heating system (electrical components) and essential loads as required by the User.

SECTION 16200 WIRING AND DEVICES**A. Wiring shall consist of insulated copper conductors installed in raceways. Aluminum conductors are not allowed.**

1. Voltage drop allowed for wiring shall comply with N.E.C. Voltage drop shall be computed based on calculated demand loads per NEC plus 25% spare capacity.
2. All raceways shall be concealed where practicable, except in utility rooms not subject to inmate access. Where concealment is not practicable within any area accessible by inmates, raceway shall be galvanized rigid steel strapped to wall or ceiling and grouted along sides to prevent any person from grabbing conduit.
3. All boxes shall be flush-mounted where practicable with security screws. Where concealment is not practicable within security zones and any area accessible to inmates, boxes shall be cast metal type secured to wall or ceiling and grouted along all sides to prevent any person from grabbing box.

B. Branch Circuit Devices

1. Provide duplex convenience outlets along all walls in all rooms/areas, except for inmate cells and as required by the User. In general, duplex receptacles should be provided at minimum 12 feet on center along walls with at least two outlets per workstation or work area of 50 square feet or less and minimum four outlets for workstation or work area up to 100 square feet. Maximum of six convenience receptacles shall be allowed on each circuit. Outlets on common walls shall be offset and not mounted back-to-back. All receptacles shall be hospital grade grounded via insulated ground wires and flush mounted in walls.
 - a. All receptacles and light switches shall be premium specification or hospital grade, flush-mounted on walls.
 - b. Receptacle circuits within security and inmate-accessible areas shall be protected by ground fault circuit interrupter (GFCI) type breakers.
 - c. Receptacles located outdoors and near sinks and appliances with water shall be protected by ground fault circuit interrupter (GFCI) type breakers.
 - d. Provide isolated ground surge suppression receptacles for all computers.
2. All branch circuits shall be minimum 20 amperes. Circuits shall have minimum 25% spare capacity for future growth.
3. In addition to convenience outlets, provide special outlets on dedicated circuits for HVAC equipment, kitchen equipment, laundry equipment, copy machines, electric water coolers, laser printers and all other equipment as required and sized per N.E.C. Provide disconnect switches for all motors and equipment. Refer to applicable sections of the Pre-Architectural Program for brief description of other systems which will require electrical power connections.
4. Device Plates: Device plates shall be provided for all outlets and fittings to suit the devices installed. All plates shall be stainless steel. Plates on finished walls shall be factory painted to match wall finish. Screws shall be stainless steel with countersunk heads, in a color to match the

finish of the plate.

- a. Plates installed outdoors and in wet locations shall be weatherproof with gasketed flip-open covers.
- b. Plates in shop and maintenance areas shall be dust tight.
- c. Device plates for telephone and data outlets shall have covers with blank inserts for future replacement with appropriate device.
5. Detention grade security plates with security screws shall be provided within security and inmate accessible areas.

SECTION 16.300 LIGHTING

A. Lighting system shall be complete with all supports, mounting accessories, wiring and controls. All luminaire accessories shall be appropriate for use and location. Provide light fixtures so as not to interfere with occupants and normal facility operation, to allow for convenient maintenance without the use of special equipment or lifts, and to be maintained by in-house personnel.

1. Illumination levels shall conform to the Illuminating Engineering Society (IES) Lighting Handbook and OSHA regulations. Illumination levels for cells shall conform to American Corrections Association (ACA) standards for Adult Local Detention Facilities. For programmed spaces which do not correspond with areas/activities listed in the IES or where usages differ from the norm, manufacturers' recommendations or other sources should be referenced and input from the User should be obtained.
2. Lighting system shall comply with International Energy Conservation Code, 2003 Edition, and applicable state energy code(s) where applicable. The system performance criteria shall be used for areas or activities which may apply. Exceptions may be allowed for high risk areas identified by security or safety officials as requiring additional lighting.
3. Energy efficient fluorescent or metal halide luminaires, lamps and ballasts shall be utilized across all interior areas wherever practicable. Where available for the fixture type selected, provide electronic ballast and T8 fluorescent lamps (3000 degree K). Otherwise provide energy saving or high power factor ballasts and warm white fluorescent lamps.
4. Light sources shall be diffused to avoid focusing strong light sources directly above equipment. Light fixtures and their locations shall not generate unnecessary heat and be uncomfortable when viewed directly looking up. Light fixtures in showers shall be gasketed and suitable for wet locations.
5. Detention grade security type light fixtures shall be provided in all security and inmate accessible areas.
6. Lighting control shall include multiple local switches in all areas to allow turning off lights in unoccupied areas without infringing on those occupied for energy savings. Controls within inmate housing shall be provided at Control Rooms. For administrative areas with daylighting, controls shall be capable of dimming or turning on and off artificial lights in response to the amount of daylight available. Occupancy sensors shall be provided in Administrative areas not accessible to inmates as required to meet lighting power requirements of any applicable energy code(s).

SECTION 16.400 TELEPHONE, DATA AND CATV SYSTEMS

A. Design and install cabling, raceways, and telephone instruments complete for a functional system. The telephone data and CATV shall be designed and constructed in accordance with EIA-TIA 568 and 569, manufacturer's recommendations, and service provider requirements. The Proposer shall verify and coordinate requirements with the appropriate utility companies for any off-site improvements and charges.

1. All outlets shall have minimum one voice and one data jack except only voice jacks are required for inmate visitation booths.

B. Telecom rooms shall be secured and not be accessible by inmates and shall house telephone, data,

and CATV wiring terminal equipment, patch panels, hubs, servers, switches, etc. All equipment shall be connected to emergency power and uninterruptible power supply (UPS) should be provided.

- C. A Category 5 UTP horizontal station cable should be provided from each jack to the IDF on the floor with main trunklines and between the IDF's and the MDF. The trunklines should consist of multiple single mode and multiple mode fiber optic and 25 pair Category 5 UTP cables for data. One or several local area networks (LAN's) shall be provided for the facility.
- D. CATV outlets shall be provided in each dayroom, lounges, conference rooms, classrooms, and as requested by the User. A RG-6/u coaxial cable should be provided from each outlet to splitters and amplifiers in the IDF's with larger coaxial cable trunklines provided between the IDF's and MDF.
- E. Inmate pay phones shall have monitoring capabilities by Correctional Officers. Raceways shall be provided from the pay phones to a correctional officer monitoring station.

SECTION 16.500 FIRE ALARM SYSTEM

- A. Comply with local fire and related codes and ordinances including the National Fire Code, especially National Fire Alarm Code (NFPA 72) and Life Safety Code (NFPA 101), National Electrical Code, and International Building Code.
 - 1. Provide a complete and operational fire alarm system consisting of manual pull stations, smoke and heat detectors, visual and audible alarm signaling (notification appliance) devices, control, monitoring and annunciation requirement, including all wiring and accessories and mounting and control of related systems such as duct smoke detectors, sprinkler flow and tamper switches, kitchen hood and other fire extinguishing systems. Control equipment and battery backup and fire alarm circuits shall have minimum 25% spare capacity for future growth.
 - 2. Comply with American Disabilities Act Accessibility Guidelines (ADAAGS) and manufacturer's recommendations.
 - 3. All wires shall be installed in raceways. All raceways shall be concealed where practicable, except in utility rooms not subject to inmate access. Where concealment is not practicable within any area accessible by inmates, raceway shall be galvanized rigid steel strapped to wall or ceiling and grouted along sides to prevent any person from grabbing conduit. Security grilles with security screws shall be provided in inmate housing and other inmate accessible areas.
 - 4. Remote annunciators shall be provided in Control Rooms and at main entry to facility in accordance with local fire Department requirements. Control panels and equipment and cabinets shall be located within secured area not accessible to inmates.

SECTION 16.600 PUBLIC ADDRESS AND INTERCOMMUNICATION SYSTEM

- A. Provide public address and intercommunication systems in accordance with User requirements and as required by security electronics considerations.
 - 1. All wires and cables shall be installed in raceways. Cable trays for telephone, data, and CATV systems may be utilized in accessible ceiling spaces of non-inmate areas. Conceal all raceways where practicable, except in telecom rooms not subject to inmate access. Where concealment is not practicable within any area accessible by inmates, raceway shall be galvanized rigid steel conduit strapped to wall or ceiling and grouted along sides to prevent any person from grabbing conduit. Where telephone, data and CATV conduits are provided, there shall not be more than two 90 degree bends between boxes. Raceway installation shall comply with EIA-TIA 569.
 - 2. Public address and terminal cabinets and headend equipment shall be located within secured rooms not accessible to inmates. Microphones and control stations shall be provided in each

control room. All equipment shall be connected to emergency power and UPS shall be provided. Adequate coverage shall be provided throughout the facility with separate paging zones provided in accordance with User requirements.

SECTION 16.700 TELEVISITING, TELEMEDICINE AND OTHER VIDEO SYSTEMS

- A. Provide telemedicine and video conferencing systems in accordance with the Pre-Architectural Program and user requirements.
 - 1. If provided, televisiting stations shall be provided in the televisiting booth(s) at inmate housing for communication between inmates, friends, and relatives. The televisitation system shall be compatible with any visitors' stations set up at selected sites in the State of Montana.
 - 2. Telemedicine stations shall be provided within the treatment and examination rooms to support the medical services component as required by the Pre-Architectural Program.
 - 3. Video conferencing system should be provided for the conference rooms. The video conferencing system shall be compatible with other systems that may be operated by various departments of the State of Montana.
 - 4. Station outlets and cables shall be similar to telephone/data system and comply with EIA-TIA 568. The system shall utilize the backbone provided for the Data system.

Section 16.800 GROUNDING

- A. Except where specifically indicated otherwise, all exposed non-current carrying metallic parts of electrical equipment, metallic raceway systems; grounding conductors and the neutral conductor of the wiring system shall be grounded. The grounds and connections shall be made as required by Article 250 of the NEC.

END OF DIVISION 16